

From ASTDR fact Sheet (one of the best sources, black text stolen from the fact sheet, blue text is my addition)

What is asbestos?

Asbestos is the name given to a group of six different fibrous minerals that occur naturally in the environment. Asbestos fibers are too small to be seen by the naked eye. They do not dissolve in water or evaporate. They are resistant to heat, fire, and chemical or biological degradation.

Naturally occurring asbestos refers to those fibrous minerals that are found in the rocks or soil in an area and released into the air by one of the following methods:

- Routine human activities
- Weathering processes

Asbestos is used in many commercial products, including insulation, brake linings, and roofing shingles.

Where asbestos is found in your environment

Asbestos is commonly found in ultramafic rock, including serpentine rock, and near fault zones. The amount of asbestos typically present in these rocks ranges from less than 1% up to about 25%, and sometimes more. Asbestos can be released from ultramafic and serpentine rock if the rock is broken or crushed.

Ultramafic and serpentine rock formations are found in areas of northwestern Washington around the San Juan Islands and western slopes of the north Cascades, in particular near the Twin Sisters and Sumas Mountain. Naturally occurring asbestos has been documented in some areas of Skagit and Whatcom Counties. The most well-known location is the Sumas Mountain slide zone in Whatcom County. The Environmental Protection Agency also recently found evidence of naturally occurring asbestos in rocks from the north side of Burlington Hill in Skagit County. Washington Department of Natural Resources has mapped potential zones of naturally occurring asbestos (link to maps) in Washington State.

Link to DNR asbestos maps and info.

http://www.dnr.wa.gov/ResearchScience/Topics/GeologicHazardsMapping/Pages/hazardous_minerals.aspx

List of labs certified in PLM via the National Institutes of Standards and Testing. There is a whole list of Washington State labs.

<http://ts.nist.gov/standards/scopes/plmtm.htm>

Search for geologists in your area in yellowpages.com or other listing.

<http://www.yellowpages.com/state-wa>

Confirm geologist is licensed in Washington State:

<https://fortress.wa.gov/dol/dolprod/bpdLicenseQuery/>

Good links to NOA fact sheets:

<http://www.epa.gov/superfund/accomp/newfactsheet.htm>

<http://www2.epa.gov/asbestos>

http://www.epa.gov/superfund/health/contaminants/asbestos/pdfs/noa_factsheet.pdf

https://fortress.wa.gov/dnr/geology/?Theme=natural_hazards

<http://www.atsdr.cdc.gov/noa/>

<http://www.arb.ca.gov/toxics/asbestos/asbestos.htm>

<http://www.arb.ca.gov/html/fslist.htm>

Can I test the sediment on my property to see if it contains naturally occurring asbestos?

If you believe that sediment from Swift Creek was used on your property, you may test the sediment to determine if it contains asbestos. The EPA currently recommends that testing for asbestos be done using a method called Polarized Light Microscopy (commonly known as PLM). Generally, levels of asbestos fibers in Swift Creek sediment should be detected by this method. Although PLM cannot measure asbestos very well when fibers are present at very low levels, PLM is the most suitable testing method available. To determine if the sediment on your property contains asbestos, contact an asbestos consultant or laboratory listed in your Yellow Pages under "Asbestos Consulting and Testing." Ask for specific instructions on safely collecting sediment samples for testing and for interpretation of test results.

<http://ts.nist.gov/standards/scopes/plmtm.htm> list of labs certified in PLM via the National Institutes of Standards and Testing. There is a whole list of Washington State labs.

From CARB Fact Sheet #1 Health Information on Asbestos, Jan 2002

Asbestos is classified as a known human carcinogen by State, federal, and international agencies.

It was identified by the Air Resources Board (ARB) as a toxic air contaminant in 1986.

Asbestos minerals belong to either the serpentine mineral group or the amphibole mineral group. The most common type of asbestos found in California is chrysotile, a serpentine mineral; other types include tremolite asbestos and actinolite asbestos which are amphibole minerals. State and federal health officials consider all types of asbestos to be hazardous. No safe asbestos exposure level has been established for residential areas.

. The risk of disease depends upon the intensity and duration of exposure. Exposure to low levels of asbestos for short periods of time poses minimal risk. Asbestos fibers can penetrate body tissues and remain in the lungs and the tissue lining of the lungs and abdominal cavity. The fibers that remain in the body are thought to be responsible for asbestos-related diseases. The illnesses caused by asbestos may not be observed for twenty or more years.

. The most common serious diseases caused by asbestos are listed below:

Asbestosis: Asbestosis is a non-cancerous lung disease related to diffuse fibrous scarring of the lungs. This disease has occurred in people heavily exposed to asbestos in the workplace and in household contacts of asbestos workers. Asbestosis can cause progressive shortness of breath and coughing.

Lung cancer: Lung cancer is a relatively common form of cancer which has been linked to smoking and a variety of occupational exposures. Cigarette smoking significantly increases the risk of lung cancer for those people exposed to asbestos.

Mesothelioma: Mesothelioma is a rare cancer of the thin membranes lining the lungs, chest, and abdominal cavity. Almost all cases are linked to prior occupational asbestos exposure.

. Most of the information on health effects comes from studies of people who were regularly exposed to high levels of asbestos in the workplace. Workplace exposures are higher and much more likely to cause disease than non-workplace exposures.

From ASTDR: <http://www.atsdr.cdc.gov/sites/eldoradohills/>

Background



El Dorado Hills, California, is about 30 miles northeast of Sacramento in El Dorado County. Naturally occurring asbestos has been identified in rocks and soil in the vicinity of El Dorado Hills.

Sampling conducted by the U.S. Environmental Protection Agency (EPA) in 2004 found that people taking part in typical outdoor recreational activities could breathe in high levels of asbestos relative to when no dust- or soil-disturbing activities take place.

Community members asked the Agency for Toxic Substances and Disease Registry (ATSDR) what this finding meant to their health and what they should do to protect their health.

In response to this request, ATSDR found that efforts to minimize exposures ([“Limiting Environmental Exposure to Asbestos in Areas with Naturally Occurring Asbestos”](#)) to naturally occurring asbestos in the El Dorado Hills area are warranted because a lifetime of exposure could increase the risk of asbestos-related diseases. ATSDR released draft findings in a health consultation on March 29, 2010 and accepted public comments until June 30, 2010.

From ASTDR’s El Dorodo health consult

<http://www.atsdr.cdc.gov/hac/PHA/ElDoradoHills/ElDoradoHillsFinalHCo8162011.pdf>

ATSDR’s top priority is to ensure that people living in the El Dorado Hills area have the best information possible to safeguard their health. ATSDR is a public health agency that provides information and makes recommendations to reduce or prevent harmful exposures to hazardous substances in the environment.

ATSDR conducted this health consultation in response to concerns about potential community exposures to naturally occurring asbestos (NOA) deposits in local soil and rock formations. Sampling conducted by the U.S. Environmental Protection Agency (EPA) had previously shown that people performing typical outdoor recreational activities could breathe in high concentrations of NOA, compared to reference samples. Community members asked ATSDR what this finding meant to their health and what they should do to protect their health.

To answer these questions for the community as a whole, ATSDR used the EPA sampling results to estimate how much NOA an El Dorado Hills resident might breathe in throughout life. Several different risk assessment calculation methods were then compared to get a general sense of the risk of developing asbestos-related cancers from those exposures. Finally, results of additional studies on NOA in the El Dorado Hills area were examined.

Increase Awareness

- El Dorado County should continue to assess the community's knowledge about the presence and associated risk of NOA and to provide information about ways to manage the risk. ATSDR can provide assistance, if requested.
- - ♦ El Dorado County should implement, to the extent possible, effective ways to:
 - ○ Maintain current records of locations known to contain NOA and
 - ○ Notify current and prospective landowners of the possibility for NOA to exist in soil or bedrock on their property.

Limit Exposure

- ♦ State and local entities should continue to enforce applicable dust regulations throughout the community, which will reduce releases of NOA. These regulations include:
 - ○ Prohibition of visible dust emissions outside the property line or more than 25 feet from the point of dust-disturbing activities,
 - ○ Implementation of procedures to prevent vehicles and equipment from releasing dust or tracking soil off-site, and
 - ○ Requirements for planning, notification, and record-keeping.
- Community members and groups should learn how to minimize their exposure to NOA while conducting their normal activities. ATSDR guidelines are included in Appendix H of this report.

Reducing exposures to NOA will protect people's health and is warranted in El Dorado County based on estimates of past exposures. State cancer registry information indicates that the community's health has not been impacted at this time. However, health impacts to individuals from past exposures are highly variable and may take years before the cancer registry detects them.

Basis for conclusion

Next Steps

For More Information

- The association between asbestos exposure and disease is well established. Preventing inhalation of asbestos will reduce risk of disease.
- Mesothelioma incidence, tracked by the California Cancer Registry, is not higher than expected in western El Dorado County at this time. However, mesothelioma may take decades after exposure to appear.
- Although the community in general is estimated to have an increased risk of exposure and disease, individuals' risk may vary widely due to the sporadic nature of NOA occurrences and individual behaviors leading to exposure. Individual assessment by personal health care providers for those who are concerned about past exposures will be more efficient than general community screening in treating any health effects that may appear.

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Because of its geological history, the state of California (including portions of El Dorado County and many other counties) contains areas with a high proportion of silicate rocks high in magnesium; these rocks are called ultramafic rocks. Under certain geological conditions, ultramafic rocks can be altered to serpentinite, the greenish-colored "State Rock of California." This alteration process can also result in formation of different types of asbestos. Asbestos minerals can be formed in other types of rocks but they are more commonly formed in ultramafic rocks and near fault lines which provide necessary conditions for asbestos formation [1]. These rock types, along with geological conditions leading to formation of asbestos, have occurred not only in areas of California, but in many other places throughout the United States and the world.

For many years, geologists have been aware of the potential of serpentine rocks to contain asbestos. However, the potential for harmful exposures to the public to occur does not appear to have been realized until relatively recently. California was one of the first states to become aware of the potential for public exposure to asbestos deposits in the mid-1980s.

What is Asbestos? A General Term for a Group of Commercially Valuable Minerals

Asbestos refers to a special form of certain minerals that consists of long, thin, crystals (fibers) that are particularly strong, flexible, and heat resistant. They often form in bundles of very thin fibers called fibrils; their shape and flexibility means they can be woven or processed easily, but because they are silicate-based minerals, they don't react with other chemicals, conduct electricity, degrade, or burn. Asbestos minerals have been used for thousands of years. However, the scale and variety of uses, and the number of workers who mined and processed the asbestos, was small until after the industrial revolution, in the late 1800s.

Figure 3. Structural Differences Between Amphibole and Serpentine (Chrysotile) Asbestos

Both amphibole asbestos and chrysotile have a basic framework of silica tetrahedra, where a blue silicon atom is surrounded by gray oxygen atoms; oxygen atoms are shared between tetrahedra to form polymers with different structures. In amphibole asbestos, the polymer forms as a double chain (shown on the left) which can form long, thin fibrous structures. Chrysotile, in contrast, forms a sheet structure as illustrated on the right. Because of ionic charge imbalances the sheet tends to roll up in thin tubes which create the fiber. [Diagrams used with permission from Steven Dutch, Professor, University of Wisconsin – Green Bay]

While all asbestos is ultimately natural in origin, from a public health perspective, the term NOA is used to refer to asbestos and asbestos-like minerals that are not intentionally mined or used commercially, but whose disturbance could release fibers into the air, causing exposure and, possibly, asbestos-related disease.

After reviewing the literature on illness and NOA, (the whitewash and stucco and stove communities)

- The exposures are different. In the studies cited above, the exposures were not very well characterized, but certain observations can be made. The materials implicated contained high levels of asbestos and were sought out for specific uses; the materials were used widely in the towns; and because of this wide use, the exposures were probably consistent, relatively high and occurring for long durations. Specific occurrences of NOA in the El Dorado Hills area may be highly concentrated, but they are not very large, the NOA is not evenly distributed throughout the area, and the NOA (or material containing NOA) is not intentionally used for specific purposes.

Although these differences may be important, limited studies have suggested that exposure to NOA in California could be a problem. Pan *et al.* examined mesothelioma cases diagnosed between 1988 and 1997 (as reported in the State registry) in relation to possible occupational exposure and proximity to NOA (after controlling for occupational exposure) [78]. While the authors did find a statistical correlation between proximity to NOA and mesothelioma incidence, the study can only be considered suggestive because of the limited data available for analysis. Occupational exposure was determined using the longest occupation or industry listed for each case in the registry; this may miss important exposures that were not listed in registry data. Perhaps more importantly, for cases that had no known occupational exposure, the distance to NOA was measured using the house or street level address at diagnosis and the edge of the nearest ultramafic rock formation on geologic maps as a surrogate for NOA source rocks. The residence at diagnosis may not reflect the location where exposure

occurred many years previously, and ultramafic rocks do not always or exclusively host asbestos. Finally, studies of asbestos exposure generally indicate that exposure is highly dependent on the specific area of disturbed asbestos – asbestos concentrations often cannot be measured just a few feet away from the disturbed area. For this reason, the cited distances in Pan *et al.* may not be relevant for NOA exposures (“odds of mesothelioma decreased approximately 6.3% for every 10 km farther from the nearest asbestos source”).

In summary, this review of scientific literature demonstrates NOA’s potential to cause asbestos-related disease and supports the concern about NOA exposure in El Dorado Hills. Because of the differences cited above between exposure in El Dorado Hills and other NOA locations worldwide, and because of the limitations of studies using local health outcome data, ATSDR focused our evaluation on using risk assessment methods to assist in determining whether the exposures occurring in this community could be of concern.